TERRAIN AND CONTOUR DATA
TOCCOA FALLS COLLEGE
BELTON, SOUTH CAROLINA

ERP = 50 kW
FM - 2-6 Tables

Azimuth Deg T.	Ave. Elev. 3 to 16 km Meters AMSL	Effective Antenna Height Meters AAT	ERP (dBk)	F(50-50) Distance to 60 dBu Contour km
0	240.9	67.1	16.990	37.7
45	226.2	81.8	16.990	40.7
90	218.4	89.6	14.003	36.7
135	195.9	112.1	9.496	32.6
180	201.6	106.4	4.983	25.0
225	210.8	97.2	4.983	23.9
270	217.2	90.8	9.009	28.8
315	221.7	86.3	13.498	35.3
Ave. =	216.6 M	91.4 M		

Antenna Radiation Center AMSL = 308.0 M

Geographic Coordinates:

North latitude: 34 23 43
West longitude: 82 29 49

SEPEMBER 30, 1991

CIRCULARLY POLARIZED DIRECTIONAL ANTENNA SYSTEM
PROPOSED FOR THE NEW STATION
LOCATED IN HONEA PATH, SC

Electronics Research Inc. proposes to provide a custom fabricated directional antenna system that is specially designed to meet the F.C.C. requirements and the general needs of the new station.

The antenna is the E.R.I. LP-4E-DA-HW configuration. The proposed circular polarized system consists of 4 half-wavelength spaced bays using one driven circular polarized radiating element per bay, 2 horizontal parasitic elements per bay and 2 vertical parasitic elements interleaved between alternate bay pairs. The antenna will be tested on a 18" Utility tower, which is the structure the station plans to use to support the proposed array. All tests will be performed on a frequency of 88.5 megahertz which is the center of the FM broadcast channel assigned to the new station.

Pattern measurements will be made on a fifty-acre antenna pattern range which is owned and operated by Electronics Research, Inc. The tests will be performed under the direction of Thomas B. Silliman, president of Electronics Research, Inc. Mr. Silliman has both the Bachelor of Electrical Engineering and the Master of Electrical Engineering degrees from Cornell University, and is also a registered professional engineer in the states of Indiana, Maryland and Minnesota.

DESCRIPTION OF THE TEST PROCEDURE

The test antenna will consist of two bay levels of the circular polarized system with the associated horizontal and vertical parasitic elements. The elements and brackets that will be used in this test are electrically equivalent to those that will be supplied with the proposed antenna. Sections of 3 1/8 inch o.d. rigid coaxial line will be used to feed the test antenna, and sections of 3 1/8 inch o.d. rigid outer conductor only will be attached above the test antenna. All feed lines will be over one half-wave in length. The lines will be properly grounded during all tests.

The proof-of-performance will be accomplished using a supporting structure of identical dimensions and configuration as

SEPEMBER 30, 1991

CIRCULARLY POLARIZED DIRECTIONAL ANTENNA SYSTEM
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(Continued)

the proposed 18" Utility tower, including all braces, ladders, conduits, coaxial lines and other appurtenances that are included in the actual aperture at which the proposed antenna will be installed. In order to fabricate an accurate model of the support structure E.R.I. will need accurate prints of it. These prints need to include the orientation of the support structure relative to true north, size and method of attachment of the legs and support braces in the antenna aperture. The location of guy attachments in the aperture must also be displayed. It is prefered and in most cases imparative, that guy wires occuring in the aperture of the proposed antenna be made of an insulating material. The location and method of attachment of all conduits,

SEPEMBER 30, 1991

CIRCULARLY POLARIZED DIRECTIONAL ANTENNA SYSTEM
PROPOSED FOR THE NEW STATION
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(Continued)

The measurements will be performed by rotating the test antenna in a counter-clockwise direction and plotting the received signal on polar co-ordinated graph paper in a clockwise direction. Both horizontal and vertical components will be recorded separately.

CONCLUSIONS

The proposed circular polarized system consists of 4 half-wavelength spaced bays using one driven circular polarized radiating element per bay, 2 horizontal parasitic elements per bay and 2 vertical parasitic elements interleaved between alternate bay pairs. The power distribution and phase relationship will be fixed when the antenna is manufactured. Proper maintenance of the elements should be all that is required to maintain the pattern in adjustment.

The pattern shown on figure # 1 is based on measured data with a similar array orientated on a similar structure with a leg and the antenna at a bearing of north 25 degrees east. Actual antenna orientation will be determined when the antenna is tested. Blue prints provided with the antenna will show the proper antenna orientation alignment. The antenna alignment procedure should be directed by a licensed surveyor as prescribed by the FCC.

Deicers are not supplied and are not available. The use of radomes is recommended if icing conditions will exist at the proposed site.

Figure #1 represents the maximum value of either the horizontal or vertical component at any azimuth. The attached horizontal plane relative field pattern shown on Figure #1 represents the maximum achievable radiation at any azimuth. The actual pattern when measured will not exceed that of Figure #1 at any azimuth. The composite horizontal and vertical maximum relative field envelope pattern obtained from the measured data will have an R.M.S. that is equal to, or no less than 85% of the R.M.S. of the pattern shown on Figure #1. A calculated vertical plane relative field pattern is shown on Figure #3 attached. The power in the maximum will reach 50 kilowatts (16.99 DBK).

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CIRCULARLY POLARIZED DIRECTIONAL ANTENNA SYSTEM
PROPOSED FOR THE NEW STATION
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(Continued)

The RMS of the vertically polarized horizontal plane component does not exceed the RMS of the horizontally polarized horizontal plane component.

The envelope pattern obtained from the maximum individual horizontal or vertical components will not exceed a rate of change of 2 DB per any ten degree change in azimuth as measured in the horizontal plane.

The approximate weight of the antenna minus the mounting structure is 397 lbs. The approximate windload of the antenna minus the mounting structure is 758 lbs based on 50/33 PSF(112 MPH wind) with no ice build up. The clear vertical length of the structure required to support the antenna is 32 feet if the antenna is to be top mounted.

The directional antenna should not be mounted on the top of an antenna tower which includes a top-mounted platform larger than the cross-sectional area of the tower in the horizontal plane. No other obstructions other than those that are specified by the blue prints supplied with the antenna are to be mounted at the same tower level as the directional antenna. No obstruction of any type is to be within 75ft horizontally of the antenna system. The vertical distance to the nearest obstruction should be a minimum of 10ft from the directional antenna.

The calculated maximum power gain of the envelope pattern as shown on figure # 1 is 2.91 (4.64dB), which would require an input power of 17.179 kilowatts. A calculated power gain of an antenna that has a horizontal and vertical R.M.S. that is equal to 85% of the R.M.S. of the envelope would have a power gain of 4.03 and would require an input power of 12.412 kilowatts. The input flange to the antenna is 3 1/8 inch female.

Tom Schaaf (DE)

ELECTRONICS RESEACH, INC
108 Market Street
Newburgh, In 47630

FOR FIGURE: 1 SEPTEMBER 30, 1991
HORIZONTAL PLANE RELATIVE FIELD & DBK LIST
FOR A NEW STATION 88.5MHz

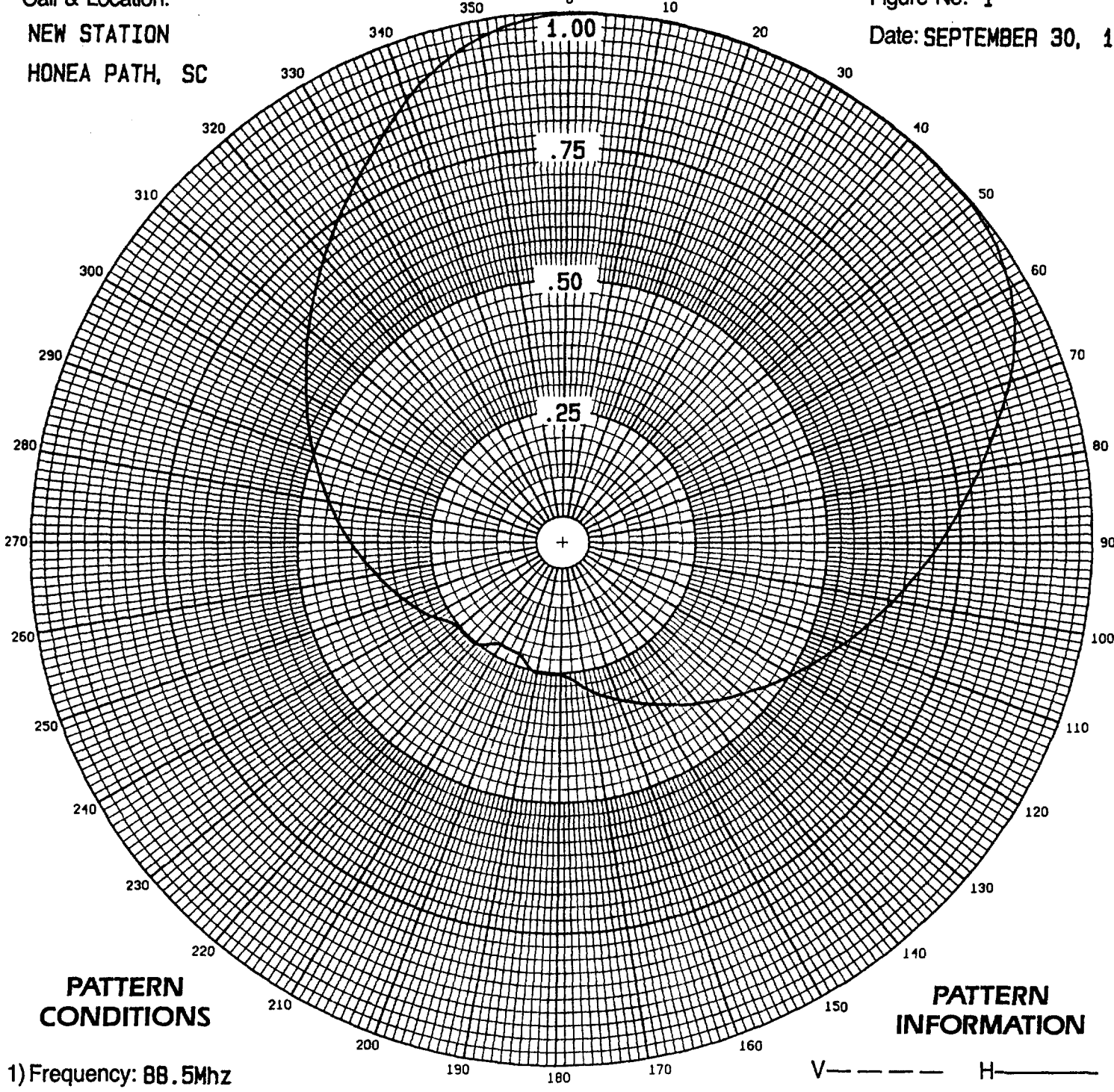
AZIMUTH	H POL RELATIVE FIELD	H POL DBK	H POL POWER KW	V POL RELATIVE FIELD	V POL DBK	V POL POWER KW	AZIMUTH	H POL RELATIVE FIELD	H POL DBK	H POL POWER KW	V POL RELATIVE FIELD	V POL DBK	V POL POWER KW
0.0	1.000	16.99	50.00	1.000	16.99	50.00	180.0	.251	4.98	3.15	.251	4.98	3.15
5.0	1.000	16.99	50.00	1.000	16.99	50.00	185.0	.251	4.98	3.15	.251	4.98	3.15
10.0	1.000	16.99	50.00	1.000	16.99	50.00	190.0	.251	4.98	3.15	.251	4.98	3.15
15.0	1.000	16.99	50.00	1.000	16.99	50.00	195.0	.238	4.50	2.82	.238	4.50	2.82
20.0	1.000	16.99	50.00	1.000	16.99	50.00	200.0	.224	3.99	2.51	.224	3.99	2.51
25.0	1.000	16.99	50.00	1.000	16.99	50.00	205.0	.224	3.99	2.51	.224	3.99	2.51
30.0	1.000	16.99	50.00	1.000	16.99	50.00	210.0	.224	3.99	2.51	.224	3.99	2.51
35.0	1.000	16.99	50.00	1.000	16.99	50.00	215.0	.238	4.50	2.82	.238	4.50	2.82
40.0	1.000	16.99	50.00	1.000	16.99	50.00	220.0	.251	4.98	3.15	.251	4.98	3.15
45.0	1.000	16.99	50.00	1.000	16.99	50.00	225.0	.251	4.98	3.15	.251	4.98	3.15
50.0	1.000	16.99	50.00	1.000	16.99	50.00	230.0	.251	4.98	3.15	.251	4.98	3.15
55.0	.991	16.91	49.10	.991	16.91	49.10	235.0	.260	5.30	3.39	.260	5.30	3.39
60.0	.970	16.73	47.05	.970	16.73	47.05	240.0	.282	5.99	3.98	.282	5.99	3.98
65.0	.937	16.42	43.90	.937	16.42	43.90	245.0	.299	6.50	4.47	.299	6.50	4.47

HORIZONTAL PLANE RELATIVE FIELD PATTERN

Call & Location:
NEW STATION
HONEA PATH, SC

MEASURED CALCULATED

Figure No: 1
Date: SEPTEMBER 30, 1991



PATTERN CONDITIONS

1) Frequency: 88.5Mhz
2) Antenna Type: LP-4E-DA-HW
3) Antenna Orientation: North 25 Deg. East
4) Antenna Mounting: STANDARD
5) Tower Type: 18" Utility tower

PATTERN INFORMATION

V— — — — H———

	VERTICAL	HORIZONTAL
Rms:	.6532	.6532
Maximum:	1 N0°E	1 N0°E
Minimum:	.224 N200°E	.224 N200°E

6) Comments: CALCULATED DATA- The composite maximum achievable value of either horizontal or vertical component.

Electronics Research Inc. 108 Market St. • Newburgh, In. 47630 • Phone (812) 853-3318 • FAX (812) 853-5706

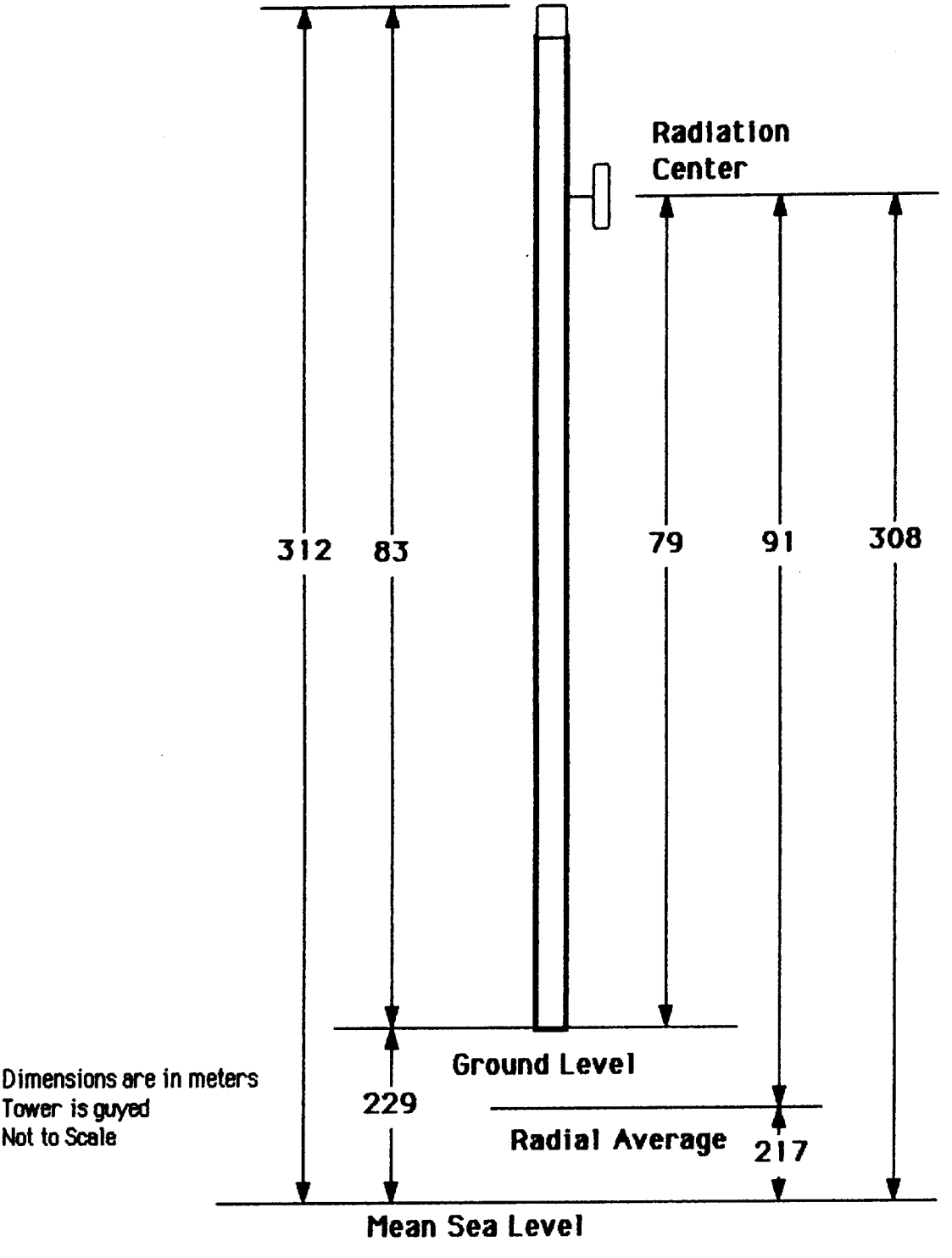
ELECTRONICS RESEARCH,INC.
108 MARKET STREET
NEWBURGH, IN. 47630

-----THEORETICAL-----
VERTICAL PLANE RELATIVE FIELD

4 ROTOTILLER ELEMENTS WITH 0 DEGREE(S) BEAM TILT
0 PERCENT FIRST NULL FILL

ELEMENT SPACING:
0.5 WAVELENGTH

FIGURE 3

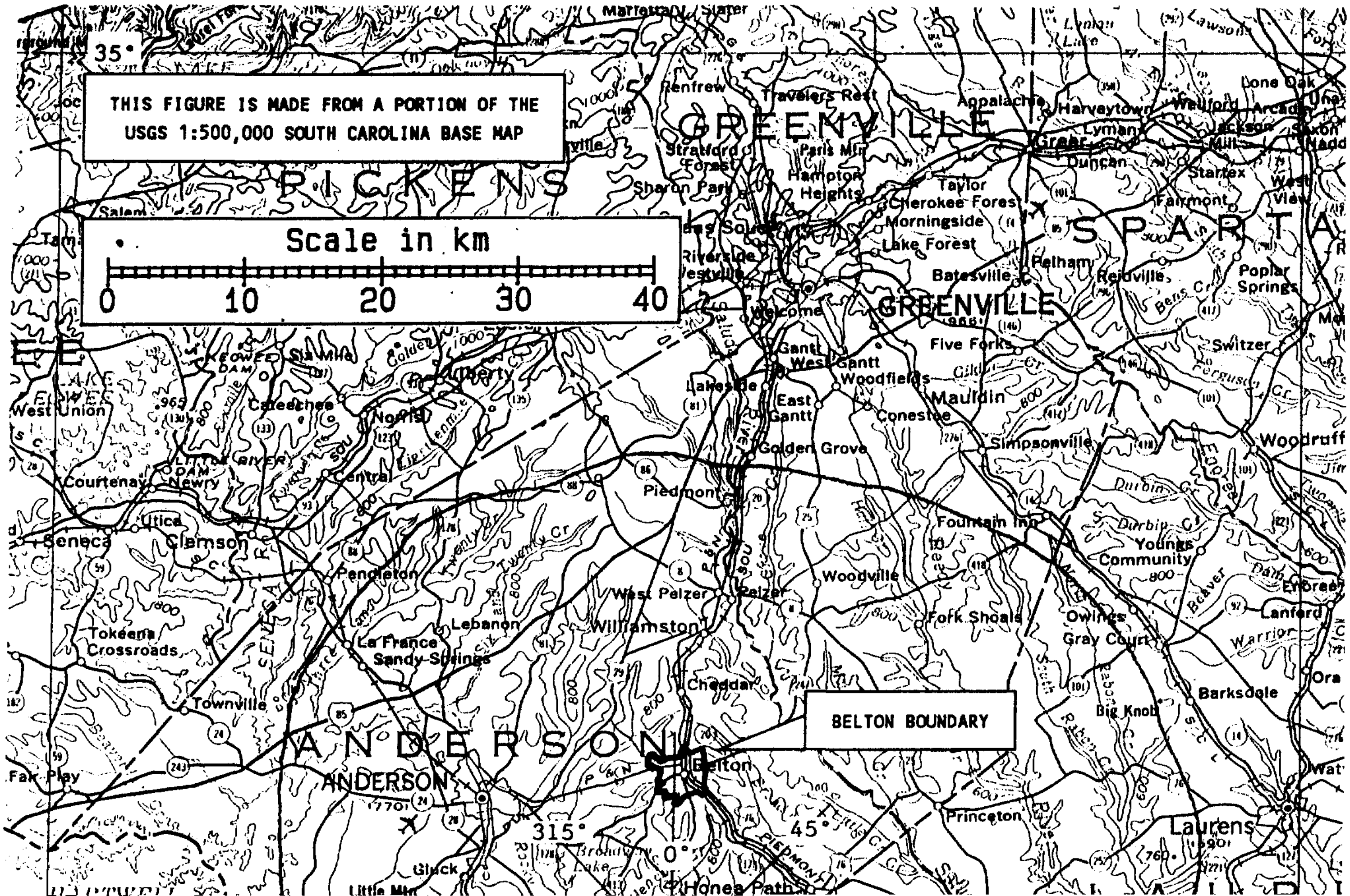


WILLIAM CULPEPPER & ASSOCIATES, Inc.
Applied Scientists in Broadcast and Communications
227 Farr's Bridge Road • Greenville, SC 29611
803-246-3401

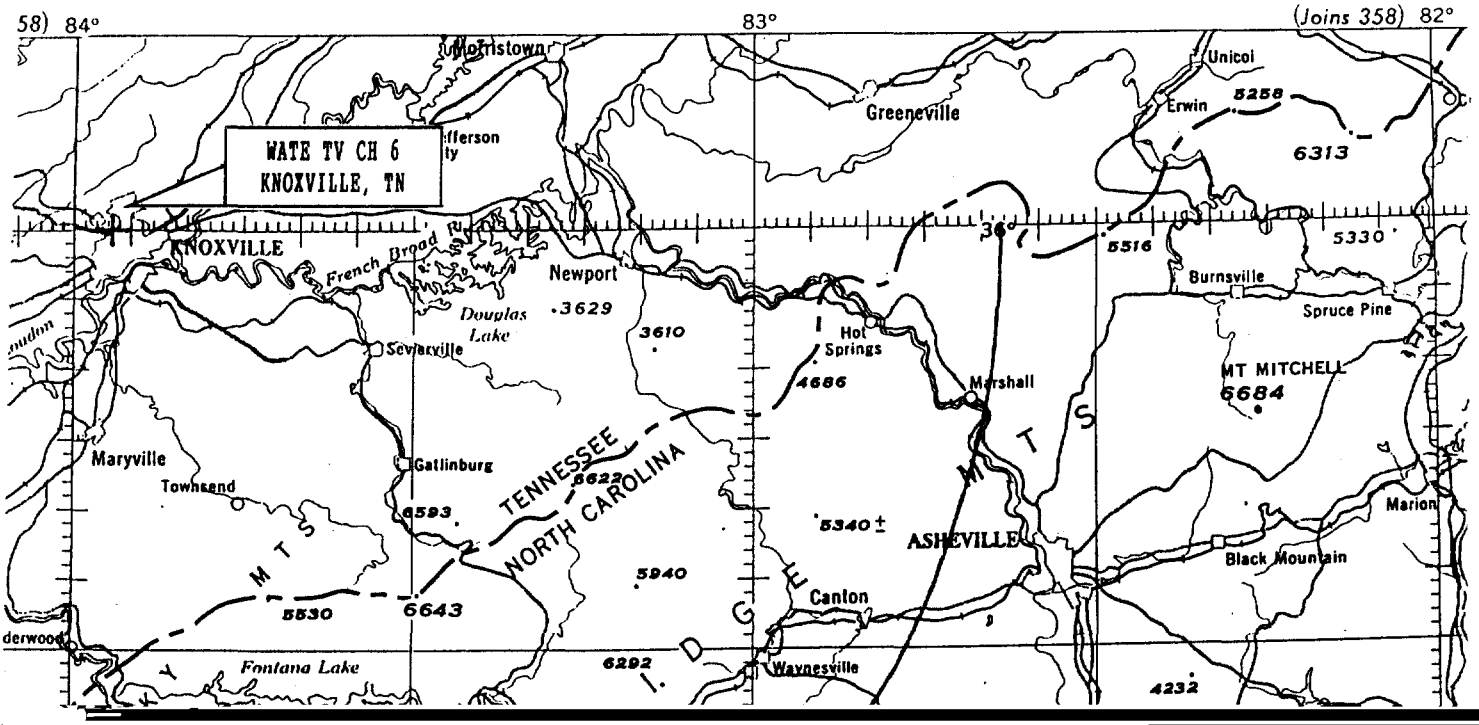
FIGURE 1

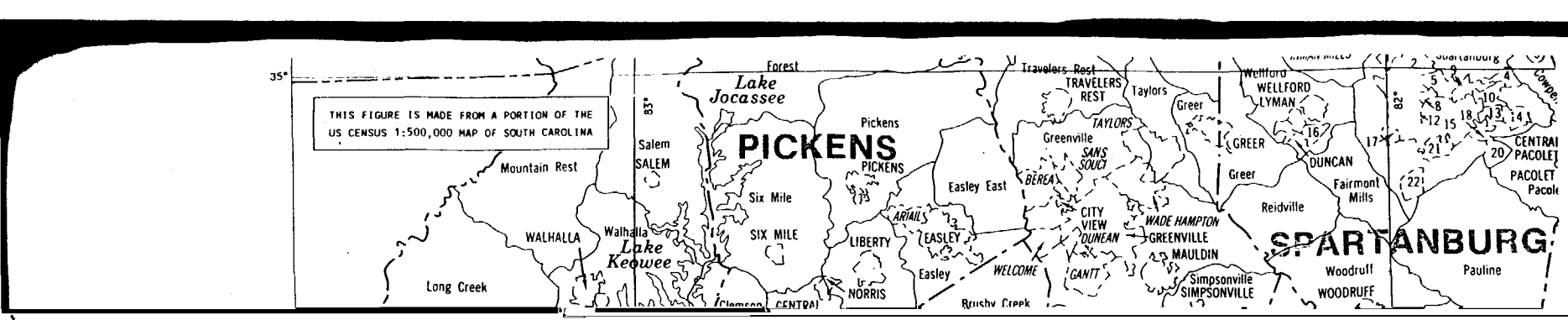
VERTICAL SKETCH

TOCCOA FALLS COLLEGE
BELTON, SOUTH CAROLINA

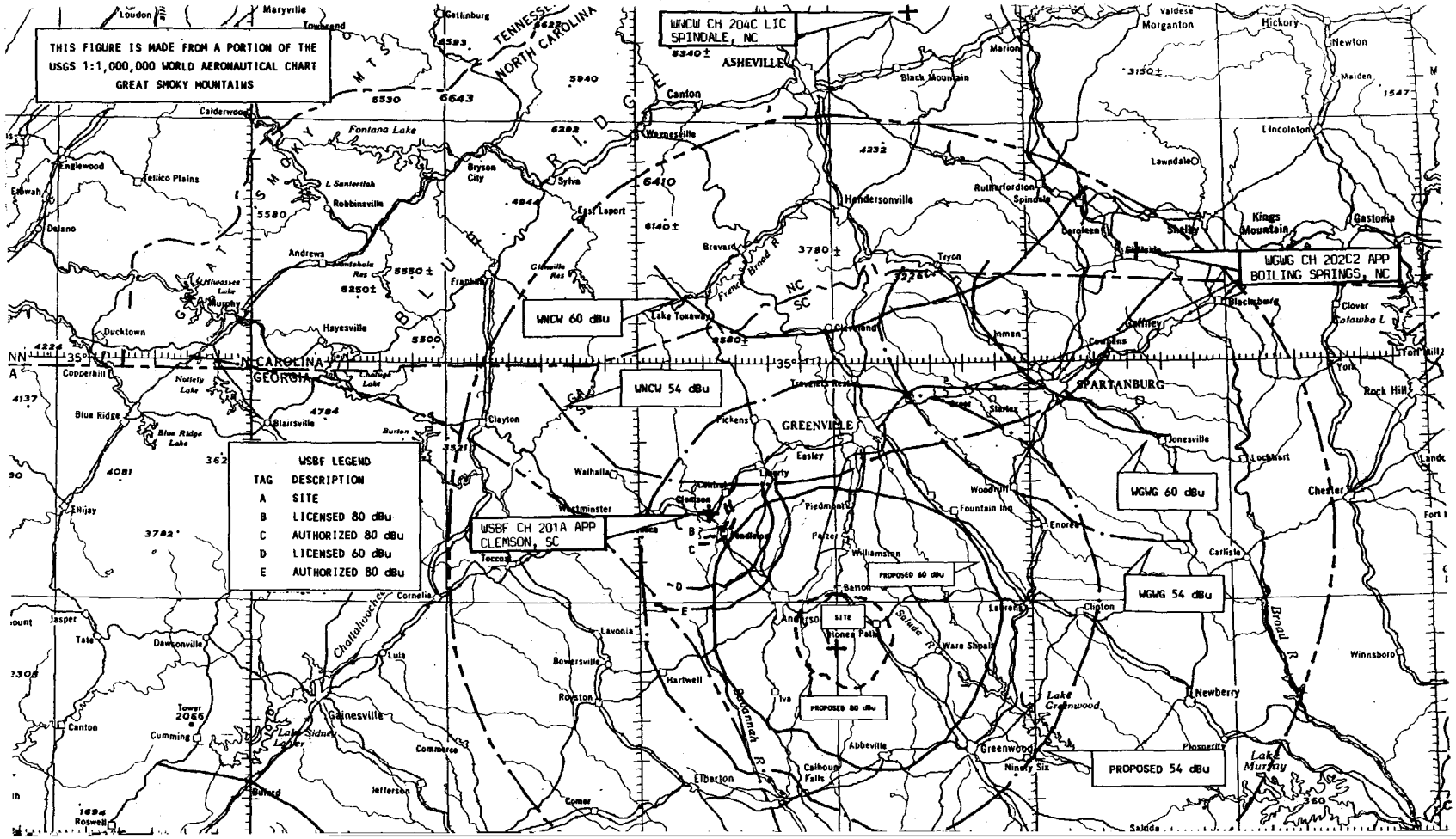

THIS FIGURE IS MADE FROM A PORTION OF THE
USGS 1:500,000 SOUTH CAROLINA BASE MAP
Scale in km
0
10
20
30
40
35°
BELTON BOUNDARY
315°
0°
45°
PICKENS
GREENVILLE
ANDERSON
SPARTA
GREENVILLE
ANDERSON
Belton
Williamston
West Pelzer
Pelzer
Piedmont
Pendleton
Clemson
Seneca
Easley
Liberty
Central
Norris
Mauldin
Simpsonville
Fountain Inn
Laurens
Honea Path
Princeton
Greer
Duncan
Lyman
Taylor
Travelers Rest
Fork Shoals
Woodville
Owings
Gray Court
Barksdale
Townville
Fair Play
La France
Sandy Springs
Lebanon
Cheddar
Golden Grove
Five Forks
Conestee
Woodruff
Tokeena Crossroads
Courtenay
Newry
Utica
West Union
Renfrew
Marietta
Slater
Berea
Welcome
Gantt
Lakeside
Batesville
Pelham
Reidville
Switzer
Poplar Springs
Youngs Community
Lanford
Big Knob
Starrex
Fairmont
Wellford
Appalachia
Harveytown
Lake Forest
Morningside
Cherokee Forest
Hampton Heights
Paris Mtn
Sharon Park
Stratford Forest
Riverside
Woodfields
Glück
Little Mtn
Broadway Lake
Catechee
Six Mile
Keowee Dam
Salem
Lone Oak


Clemson
Clemson
THIS FIGURE IS MADE FROM A PORTION OF THE


58) 84°
83°
(Joins 358) 82°
WATE TV CH 6
KNOXVILLE, TN
Morristown
Greeneville
Unicoi
Erwin
5258
6313
KNOXVILLE
French Broad R.
Newport
3629
Douglas Lake
3610
5516
5330
Burnsville
Spruce Pine
Sevierville
Hot Springs
4686
Marshall
MT MITCHELL
6684
Maryville
Townsend
Gatlinburg
6622
6593
TENNESSEE
NORTH CAROLINA
5340±
ASHEVILLE
Marion
Black Mountain
5940
Canton
5530
6643
Fontana Lake
6292
Waynesville
4232


THIS FIGURE IS MADE FROM A PORTION OF THE US CENSUS 1:500,000 MAP OF SOUTH CAROLINA
35°
83°
82°
Forest
Lake Jocassee
Travelers Rest
TRAVELERS REST
Taylors
Greer
Wellford
WELLFORD
LYMAN
Pickens
PICKENS
Greenville
TAYLORS
SANS SOUCI
BEREA
GREER
DUNCAN
Fairmont Mills
Reidville
Salem
SALEM
Mountain Rest
Six Mile
SIX MILE
Easley East
ARIAIL
EASLEY
CITY VIEW
DUNEAN
WADE HAMPTON
GREENVILLE
MAULDIN
WALHALLA
Walhalla
Lake Keowee
LIBERTY
Easley
WELCOME
GANTT
Simpsonville
SIMPSONVILLE
SPARTANBURG
Woodruff
WOODRUFF
Pauline
Long Creek
NORRIS
Clemson
CENTRAL
Roushy Creek
PACOLET
Pacolet


Six Mile
ARIAIS
CITY
VIEW
WADE HAMPTON
GREENVILLE
SPARTANBURG


THIS FIGURE IS MADE FROM A PORTION OF THE USGS 1:1,000,000 WORLD AERONAUTICAL CHART GREAT SMOKY MOUNTAINS
WNCW CH 204C LIC SPINDALE, NC
WGWG CH 202C2 APP BOILING SPRINGS, NC
WNCW 60 dBu
WNCW 54 dBu
WSBF CH 201A APP CLEMSON, SC
WGWG 60 dBu
WGWG 54 dBu
PROPOSED 54 dBu
WSBF LEGEND
TAG DESCRIPTION
A SITE
B LICENSED 80 dBu
C AUTHORIZED 80 dBu
D LICENSED 60 dBu
E AUTHORIZED 80 dBu
ASHEVILLE
GREENVILLE
SPARTANBURG
NORTH CAROLINA
GEORGIA
SOUTH CAROLINA
TENNESSEE